5 CONCLUSIONS AND RECOMMENDATIONS

In chapter 1, upon positioning the research question, and further down, upon building up our evaluation model, two questions that have guided this research has been outlined :

1. What is the nature of the relationships among shared knowledge, its components and the Manufacturing Group Performance?
2. What is the role of information technology support towards (a) sharing knowledge and (b) the Manufacturing Performance?

During the course of our research, the above said two questions were satisfactorily answered by conducting a study and using multiple regression on the data collected by means of three questionnaires on a sample of 30 Manufacturing units. The results of this analysis show that:

a) There is a positive relationship between shared knowledge and Manufacturing Performance (i.e. increasing levels of shared knowledge among Manufacturing and Quality groups, leads to increased Manufacturing group performance.

b) Shared knowledge mediates the relationship between Manufacturing Performance and Mutual Trust. Also Mutual Trust affects Manufacturing Performance in a direct way.

c) Information technology significantly affects shared knowledge, and has a less significant effect on Manufacturing Performance, though information technology's effect on shared knowledge mainly influences explicit to explicit knowledge transactions. This is contradictory to the reviewed theory. The probable reason was explained in the previous chapter.

In general, we can state that the results adequately fulfill the aim of our study, which was to investigate the contribution of shared knowledge and information technology to manufacturing group performance.

5.1 *LIMITATIONS OF THE STUDY*

In the research, only mutual trust has been considered as a variable, which affects shared knowledge. There are several others like influence, etc, which might also affect shared knowledge.

Quality group along with Manufacturing group was only considered for the study, due to time constrains. Other departments like, Plant Maintenance, Design etc also will have an impact of the Manufacturing group performance.

The sample size was only 30 companies. Further participation of more companies by increasing the sample size will further confirm the results.

5.2 *MANAGERIAL IMPLICATIONS*

The model used in our research was used to best evaluate the contribution of (a) shared knowledge among Manufacturing and Quality groups, and (b) information technology to the performance of the Manufacturing group. As the two groups under investigation, are heavily related to innovative activities and competitiveness, these two concepts have also been considered in our research. The results of the research, has helped us in formulating some guidelines for managers.

Managers should recognize knowledge and knowledge workers as the company's intellectual capital and a key factor to its sustainable development. In order for the company's intellectual capital not to be under-managed, managers can practice the main findings of our study. Managers should make sure that their subordinates:

- Include in their objectives the task to share knowledge and available information with colleagues in collaborating groups

- Are entirely aware of the information technology resources available (special groupware software and equipment).

In doing so their companies will take maximum advantage of the positive contribution that shared knowledge and information technology have to the performance of the Manufacturing group.

One particular result of our study, only 35 percent of the managers and creative workers among the participating companies use groupware software, is a strong indication that there is room for improvement in this field. Combined with other positive findings about information and communication technologies supporting knowledge - sharing (like the e-mail with 95 %, the Intranets with 71% and the Internet with 90 %, that all appear to be amply used), indicate that the infrastructures do exist for further improvements.

Building upon both literature findings, and the results of our study regarding the use of IT functions by 40% of the participating companies in facilitating team members to work together, we can conclude that: Management should facilitate the use of IT among the groups in order to improve meeting efficiency and effectiveness. Use of e-mail or the company intranet can eliminate face-to-face meetings, significantly. Computer conferencing can play an important role in meeting preparations, whenever a meeting is required.

Despite the moderately low percentages (15% to 60%) reported in our study for the use of IT functions, managers can adapt the following, to ensure that the shared knowledge and information technology are best used:

- Coordinating business tasks and facilitating team work.
- Supporting decision making processes.
- Facilitating access to information in Data Bases, collaborating knowledge workers improve their intellectual skills and may use the accumulated experience to increase Manufacturing performance

Two issues that have not been addressed by our study, first, education and training have definitely a positive role to play. Second, there are factors like the 'Resistance to change' and 'barriers to communication' that may possibly affect in a negative way both shared knowledge and Manufacturing group performance.

Factors that help eliminate such negative effects may include joint training on interdependent tasks, joint planning sessions and formation of cross- functional teams. In addition, strategic rotation of managers from one group to another, can lead to mutual trust, which is an important factor, which affects both resistance to change and barriers to communication.

In this section the guidelines to managers from the extensive review of the relevant literature and the results of our research, to leverage shared knowledge and information technology advantages to the benefit of the Manufacturing group performance, was presented. It is strongly believed, that it is the task of management to improve the channels for knowledge to be shared among Manufacturing and Quality groups, by selecting the information technologies that best fit the innovative efforts and competitive strategy of their organization. It is imperative for both senior and middle-level management to succeed in this task, so that the company benefits to the utmost from all the investment in information technology for sharing knowledge.

5.3 FUTURE RESEARCH

The methodology and the model can further be explored to examine similar organizational relationships, like Manufacturing and procurement, Manufacturing and sales/marketing etc. Future researchers can further extend their investigation based on this model and findings, by increasing the sample size and adding more performance indicators and derive industry specific parameters, which will further add value to this body of knowledge. This will enable Sri Lankan organizations to create a knowledge economy by improving their competitive edge over other developed countries.

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APPENDIX 1

QUESTIONNAIRE

RELATIONSHIP QUESTIONNAIRE A

RELATIONSHIP QUESTIONNAIRE B

PERFORMANCE QUESTIONNAIRE C

Relationship Questionnaire A
(Manufacturing Department)

Please characterize the general **working relationship** that currently exists between the Manufacturing group and the Quality Assurance group.
Use the following scale to measure constructs:

1	2	3	4	5	6
Extremely Weak	Weak	Moderately Weak	Moderately Strong	Strong	Extremely Strong

A1. The level of **appreciation** that the Manufacturing group and the Quality group have for each other's accomplishments is: ☐ ☐

A2. The level of **understanding** of the Quality group for the work environment (problems, tasks, roles, etc) of the Manufacturing group is: ☐

A3. The level of **appreciation** that the Quality group has for the accomplishments of the Manufacturing group are: ☐

A4. The level of **showing concern** by the Quality group for the success/failure of the Manufacturing group are ☐

A5, The level of the **reciprocal faith** by the Quality group with the Manufacturing group in terms of intentions and behaviors is ☐

A6. The **reputation** of the Quality group for meeting its commitments to the Manufacturing group is: ☐

A7. In general, the role and the level of **contribution** of **Information Technology (IT)** as a tool and/or enabler, to support shared knowledge between Manufacturing group and Quality group is: ☐

A8. In general, the **use** of the **Information Technology (IT) infrastructure** in the Manufacturing group is: ☐

A9. Specifically, the **use** of the following **IT infrastructure** is:

Intranet ☐ Extranet ☐ Groupware ☐, Workflow ☐
Internet ☐, e-mail ☐, ... ☐, ... ☐
Data warehouse ☐,
Other ..... ☐, ... ☐ .... ☐

CONTD:

INDEPENDENT VARIABLES

Mutual Trust : Indicator/Questions: A4, A5 and A6
I T : " : A7 and A8

DEPENDENDENT/MEDIATING VARIABLE

Shared Knowledge: Indicator/Questions: A1, A2 and A3

Relationship Questionnaire B
(Quality Assurance Department)

Please characterize the general **working relationship** that currently exists between the Quality group and the Manufacturing group.
Use the following scale to measure constructs:

1	2	3	4	5	6
Extremely Weak	Weak	Moderately Weak	Moderately Strong	Strong	Extremely Strong

B1. The level of **appreciation** that the Quality group and the Manufacturing group have for each other's accomplishments is: ☐

B2. The level of **understanding** of the Manufacturing group for the work environment (problems, tasks, roles, etc) of the Quality group is: ☐

B3. The level of **appreciation** that the Manufacturing group has for the accomplishments of the Quality group are: ☐

B4. The level of **showing concern** by the Manufacturing group for the success/failure of the Quality group are ☐

B5, The level of the **reciprocal faith** by the Manufacturing group with the Quality group in terms of intentions and behaviors is ☐

B6. The **reputation** of the Manufacturing group for meeting its commitments to the Quality group is: ☐

B7. In general, the role and the level of **contribution** of **Information Technology (IT)** as a tool and/or enabler, to support shared knowledge between Manufacturing group and Quality group is: ☐

B8. In general, the **use** of the **Information Technology (IT) infrastructure** in the Quality group is: ☐

B9. Specifically, the **use** of the following **IT infrastructure** is:

Intranet ☐ Extranet ☐ Groupware ☐, Workflow ☐
Internet ☐, e-mail ☐, ... ☐, ... ☐
Data warehouse ☐,
Other ..... ☐, ... ☐ .... ☐

INDEPENDENT VARIABLES

Mutual Trust : Indicator/Questions: B4, B5 and B6
I T : " : B7 and B8

DEPENDENDENT/MEDIATING VARIABLE

Shared Knowledge: Indicator/Questions: B1, B2 and B3

Performance Questionnaire C
(Organizational Stakeholders)

The following questions ask you to compare the Manufacturing group to other such Manufacturing groups. In relation to other comparable groups you have observed, how the Manufacturing group rates on the following.

Use the following scale to measure constructs:

1	2	3	4	5	6
Non-Existent	Very Weak	Weak	Strong	Very Strong	Extremely Strong

P1. In general, the **quality of the work** produced for the Quality group by the Manufacturing group is: ☐

P2. In general, the **ability** of the Manufacturing group **to meet** its organizational commitments (such as project schedules and budget) are: ☐

P3. In general, the **ability** of the Manufacturing] group **to meet** its goals is: ☐

P4. In general, the **ability** of the Manufacturing group **to react** quickly to the Quality group's changing business needs is: ☐

P5. In general, the **responsiveness** of the Manufacturing group to the Quality group is: ☐

P6. In general, the **contribution** that the Manufacturing group has made to the accomplishment of the Quality group's strategic goals is: ☐

P7. In general, the level of the **Information Technology (IT) contribution** to the Manufacturing group performance is: ☐

P8. In general, the use of the **Information Technology (IT) infrastructure**, between the two groups is: ☐

P9. Specifically, the **use** of the following **IT function** is:

- **Coordinating business tasks:** ☐
  (collecting, facilitating, sharing, etc. information)
- **Supporting decision making:** ☐
  (reaching the right information at the right time)
- **Facilitating member' team to work together:** ☐
  (no matter where they are)
- **Facilitating access of information in Data Bases:** ☐
  (no mater where they are)
- **Other .....:** ☐
- **Other .....:** ☐

DEPENDENT VARIABLE

Manufacturing Performane : Indicator/Questions : P1 to P8

APPENDIX 2

DESCRIPTIVE STATISTICS

MEASURE OF RELIABILITY (CRONBACH'S ALPHA)

MULTIPLE REGRESSION ANALYSIS

INTERPRETATION OF SPSS OUTPUT ON MULTIPLE REGRESSION

Descriptive Statistics

		a1	a2	a3	a4	a5	a7
N	Valid	30	30	30	30	30	30
	Missing	0	0	0	0	0	0
Mean		4.57	4.40	4.60	4.97	5.00	4.00
Std. Deviation		1.104	1.133	1.163	.890	.871	.788
Variance		1.220	1.283	1.352	.792	.759	.621

Statistics

		a8	b1	b2	b3	b4	b5
N	Valid	30	30	30	30	30	30
	Missing	0	0	0	0	0	0
Mean		3.97	4.77	4.87	4.70	4.83	5.00
Std. Deviation		.999	1.135	1.074	1.317	.913	.871
Variance		.999	1.289	1.154	1.734	.833	.759

Statistics

		b6	b7	b8	p1	p2	p3
N	Valid	30	30	30	30	30	30
	Missing	0	0	0	0	0	0
Mean		4.93	4.23	4.33	4.63	4.57	4.47
Std. Deviation		1.048	.626	.844	.999	.935	.937
Variance		1.099	.392	.713	.999	.875	.878

Statistics

		p4	p5	p6	p7	p8
N	Valid	30	30	30	30	30
	Missing	0	0	0	0	0
Mean		4.70	4.97	4.90	3.80	3.57
Std. Deviation		.702	.615	.960	.847	1.382
Variance		.493	.378	.921	.717	1.909

```
RELIABILITY
  /VARIABLES=a1 a2 a3 b1 b2 b3
  /FORMAT=NOLABELS
  /SCALE(ALPHA)=ALL/MODEL=ALPHA.
```

Reliability- Shared Knowledge

Warnings

The space saver method is used. That is, the covariance matrix is not calculated or used in the analysis.

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.914	6

```
RELIABILITY
  /VARIABLES=a4 a5 a6 b4 b5 b6
  /FORMAT=NOLABELS
  /SCALE(ALPHA)=ALL/MODEL=ALPHA.
```


Reliability- Mutual Trust

Warnings

The space saver method is used. That is, the covariance matrix is not calculated or used in the analysis.

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.863	6

```
RELIABILITY
```

```
  /VARIABLES=a7 a8 b7 b8
  /FORMAT=NOLABELS
  /SCALE(ALPHA)=ALL/MODEL=ALPHA.
```

Reliability- Information Technology

Warnings

The space saver method is used. That is, the covariance matrix is not calculated or used in the analysis.

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.619	4

```
RELIABILITY
  /VARIABLES=p1 p2 p3 p4 p5 p6 p7 p8
  /FORMAT=NOLABELS
  /SCALE(ALPHA)=ALL/MODEL=ALPHA.
```


Reliability- Manufacturing Performance

Warnings

The space saver method is used. That is, the covariance matrix is not calculated or used in the analysis.

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.820	8

```
RELIABILITY
  /VARIABLES=p_it sk mt skit per p_ser p_org
```

```
/FORMAT=NOLABELS
/SCALE(ALPHA)=ALL/MODEL=ALPHA.
```

Reliability- Overall

Warnings

The space saver method is used. That is, the covariance matrix is not calculated or used in the analysis.

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.820	7

```
GRAPH
  /SCATTERPLOT(BIVAR)=mt WITH per
  /MISSING=LISTWISE .

GRAPH
  /SCATTERPLOT(BIVAR)=p_it WITH per
  /MISSING=LISTWISE .

CORRELATIONS
  /VARIABLES=p_it sk mt per
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES
  /MISSING=PAIRWISE .

NONPAR CORR
  /VARIABLES=p_it sk mt per
  /PRINT=BOTH TWOTAIL NOSIG
  /MISSING=PAIRWISE .

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT per
  /METHOD=ENTER p_it sk mt
  /RESIDUALS HIST(ZRESID) NORM(ZRESID) .

REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT per
  /METHOD=ENTER p_it sk mt
  /PARTIALPLOT ALL
  /RESIDUALS HIST(ZRESID) NORM(ZRESID) .
```


Regression Equation 1

Descriptive Statistics

	Mean	Std. Deviation	N
per	4.7056	.60598	30
p_it	3.6833	1.04620	30
sk	4.6500	.96723	30
mt	5.0000	.70303	30

Correlations

		per	p_it	sk	mt
Pearson Correlation	per	1.000	.510	.712	.486
	p_it	.510	1.000	.236	-.012
	sk	.712	.236	1.000	.447
	mt	.486	-.012	.447	1.000
Sig. (1-tailed)	per	.	.002	.000	.003
	p_it	.002	.	.105	.475
	sk	.000	.105	.	.007
	mt	.003	.475	.007	.
N	per	30	30	30	30
	p_it	30	30	30	30
	sk	30	30	30	30
	mt	30	30	30	30

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	mt, p_it, sk[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: per

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.829[a]	.687	.651	.35823	.687	18.995	3	26	.000

a. Predictors: (Constant), mt, p_it, sk

b. Dependent Variable: per

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.313	3	2.438	18.995	.000[a]
	Residual	3.336	26	.128		
	Total	10.649	29			

a. Predictors: (Constant), mt, p_it, sk

b. Dependent Variable: per

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.256	.538		2.337	.027	.151	2.361		
	p_it	.229	.066	.395	3.464	.002	.093	.364	.927	1.079
	sk	.313	.080	.500	3.921	.001	.149	.477	.742	1.347
	mt	.230	.107	.267	2.158	.040	.011	.450	.786	1.272

a. Dependent Variable: per

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	p_it	sk	mt
1		3.913	1.000	.00	.00	.00	.00
	2	.056	8.332	.01	.88	.04	.04
	3	.022	13.302	.17	.00	.88	.06
	4	.008	21.729	.82	.11	.08	.90

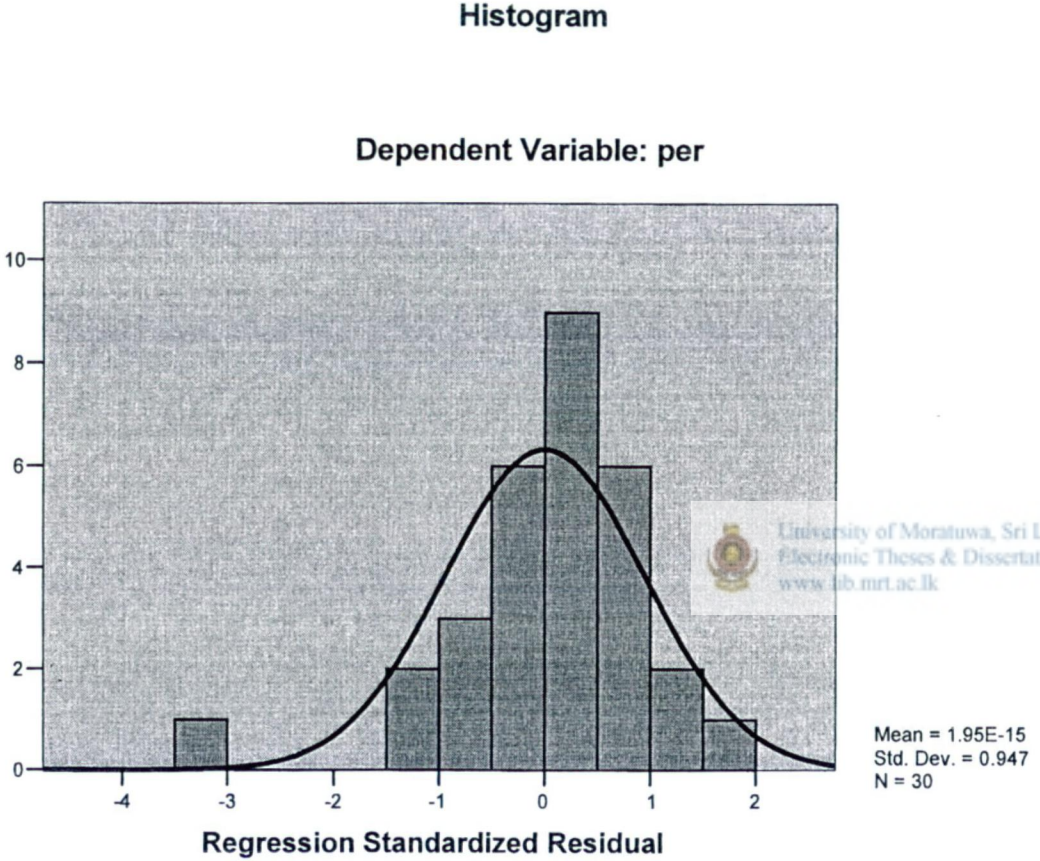
a. Dependent Variable: per

Residuals Statistics[a]

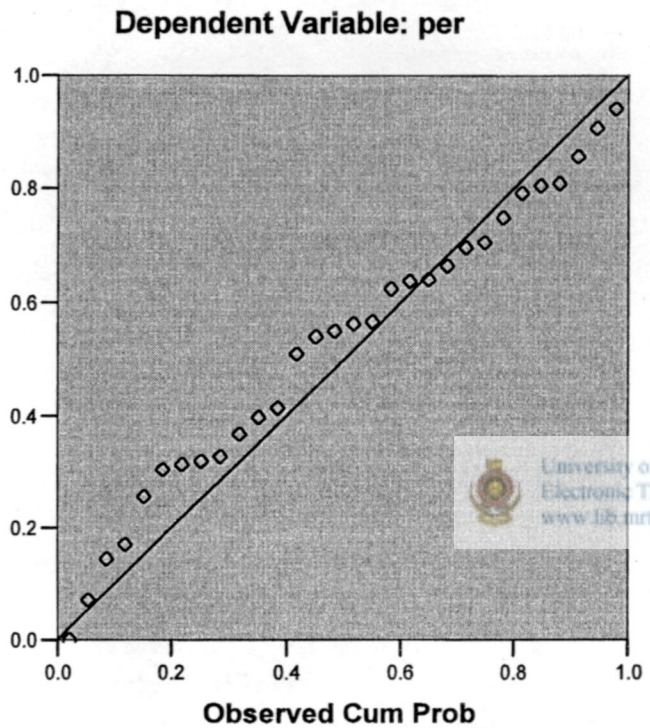
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.5346	5.5782	4.7056	.50215	30
Residual	-1.20131	.55686	.00000	.33919	30
Std. Predicted Value	-2.332	1.738	.000	1.000	30
Std. Residual	-3.353	1.554	.000	.947	30

a. Dependent Variable: per

Charts

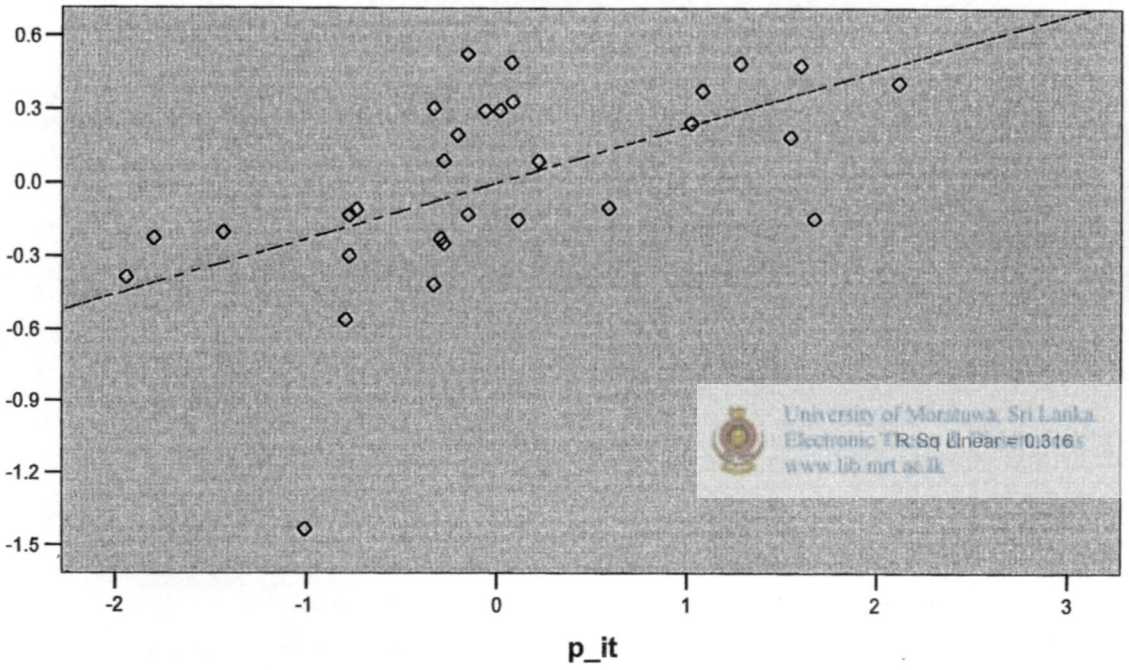


Normal P-P Plot of Regression Standardized Residual



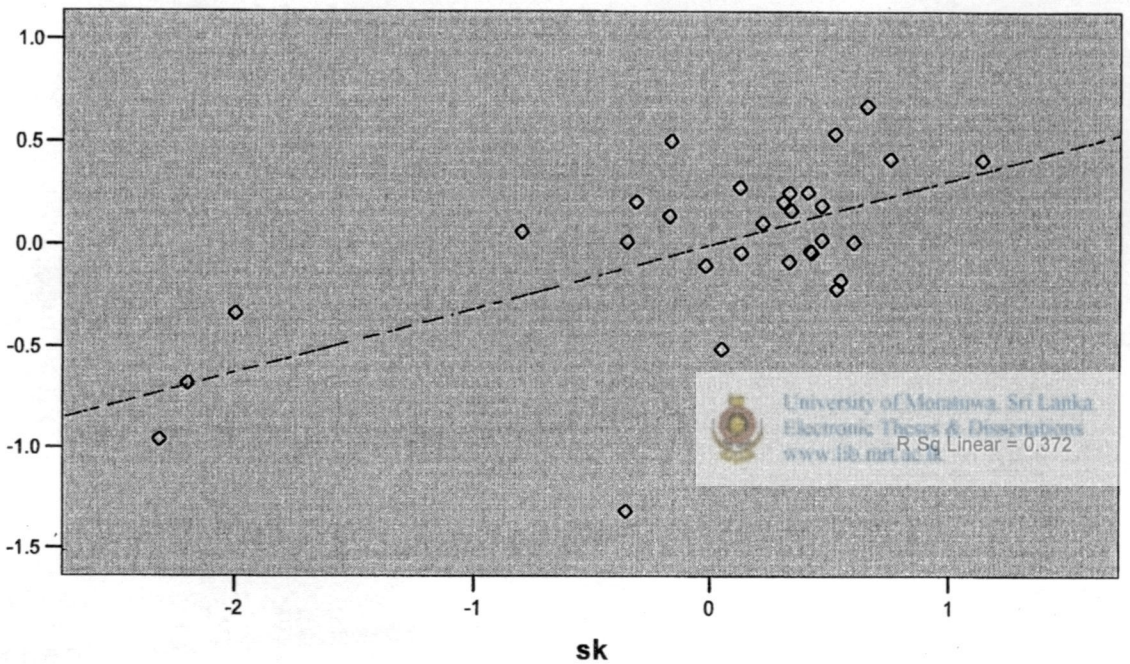
Partial Regression Plot

Dependent Variable: per



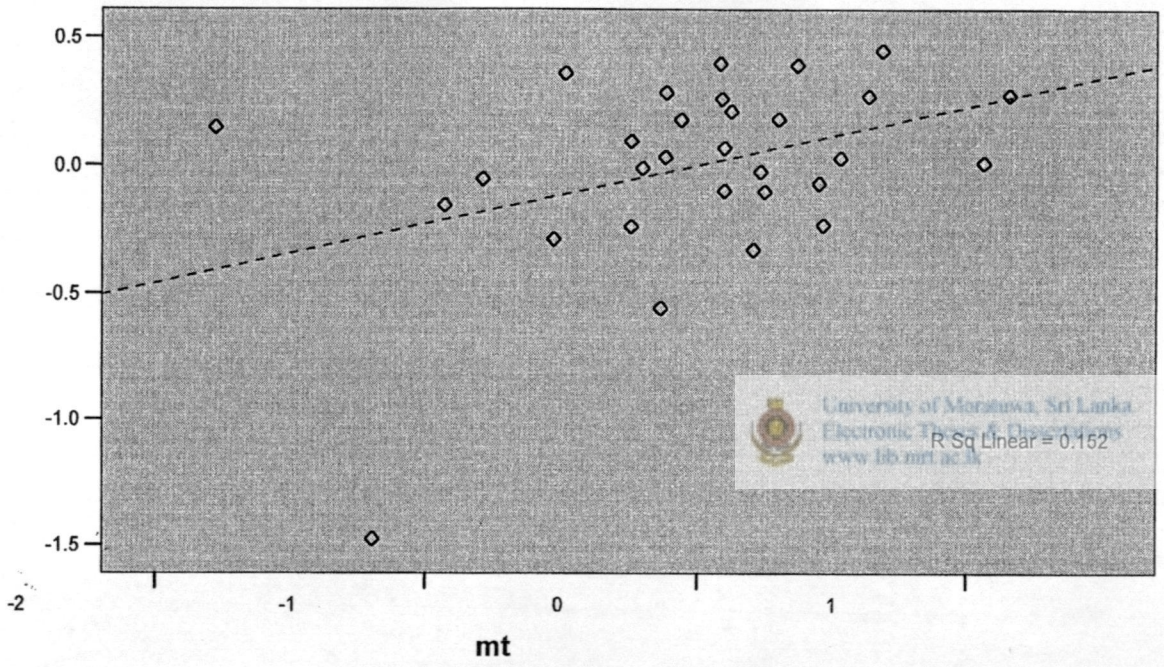
Partial Regression Plot

Dependent Variable: per



Partial Regression Plot

Dependent Variable: per



```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT sk
  /METHOD=ENTER mt skit
  /PARTIALPLOT ALL
  /RESIDUALS HIST(ZRESID) NORM(ZRESID) .
```

Regression Equation 2

Descriptive Statistics

	Mean	Std. Deviation	N
sk	4.6500	.96723	30
mt	5.0000	.70303	30
skit	4.1333	.56375	30

Correlations

		sk	mt	skit
Pearson Correlation	sk	1.000	.447	.310
	mt	.447	1.000	-.011
	skit	.310	-.011	1.000
Sig. (1-tailed)	sk	.	.007	.048
	mt	.007	.	.477
	skit	.048	.477	.
N	sk	30	30	30
	mt	30	30	30
	skit	30	30	30

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	skit, mt[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: sk

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.546[a]	.298	.246	.83960	.298	5.743	2	27	.008

a. Predictors: (Constant), skit, mt

b. Dependent Variable: sk

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.097	2	4.049	5.743	.008[a]
	Residual	19.033	27	.705		
	Total	27.131	29			

a. Predictors: (Constant), skit, mt

b. Dependent Variable: sk

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.677	1.609		-.421	.677	-3.978	2.623		
	mt	.619	.222	.450	2.791	.010	.164	1.074	1.000	1.000
	skit	.540	.277	.315	1.953	.061	-.027	1.108	1.000	1.000

a. Dependent Variable: sk

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	mt	skit
1		2.976	1.000	.00	.00	.00
	2	.018	12.712	.00	.52	.47
	3	.006	22.187	1.00	.47	.53

a. Dependent Variable: sk

Residuals Statistics[a]

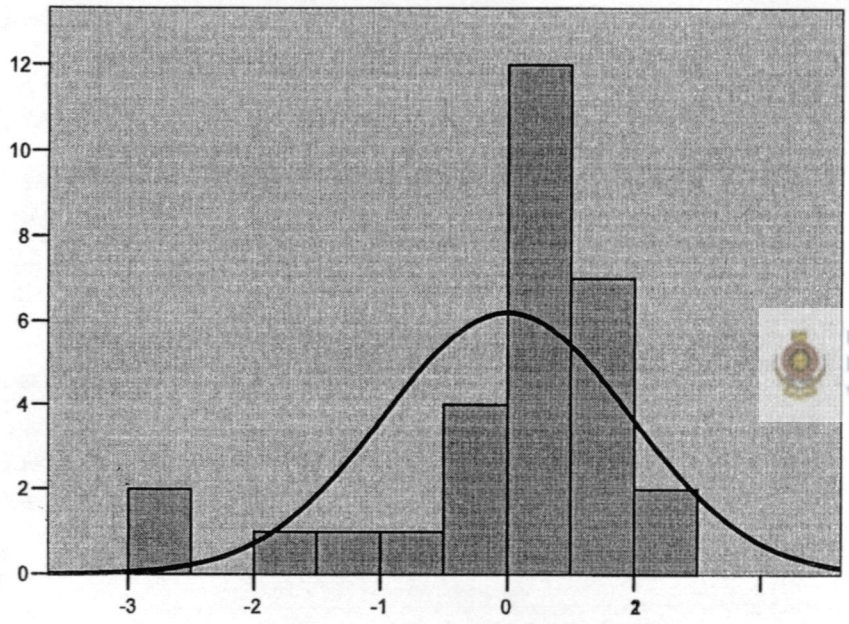
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.1412	5.5626	4.6500	.52841	30
Residual	-2.32421	.98568	.00000	.81014	30
Std. Predicted Value	-2.855	1.727	.000	1.000	30
Std. Residual	-2.768	1.174	.000	.965	30

a. Dependent Variable: sk

Charts

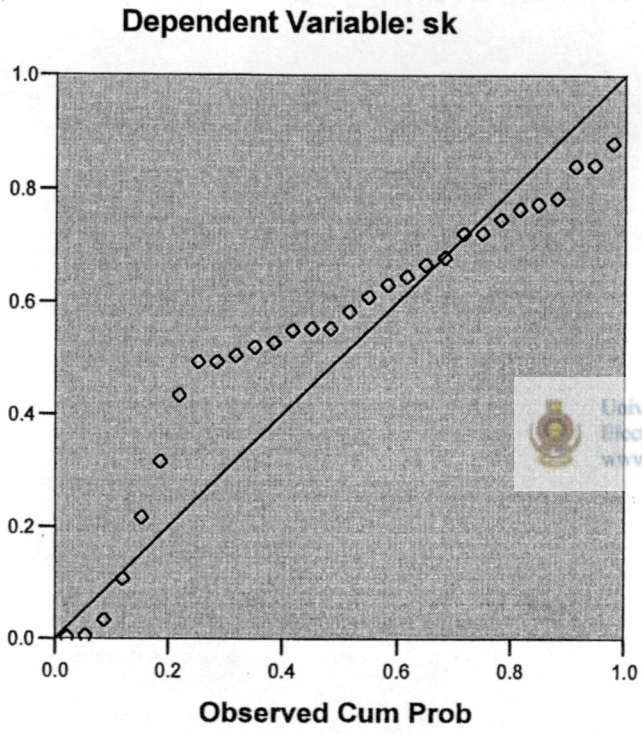
Histogram

Dependent Variable: sk



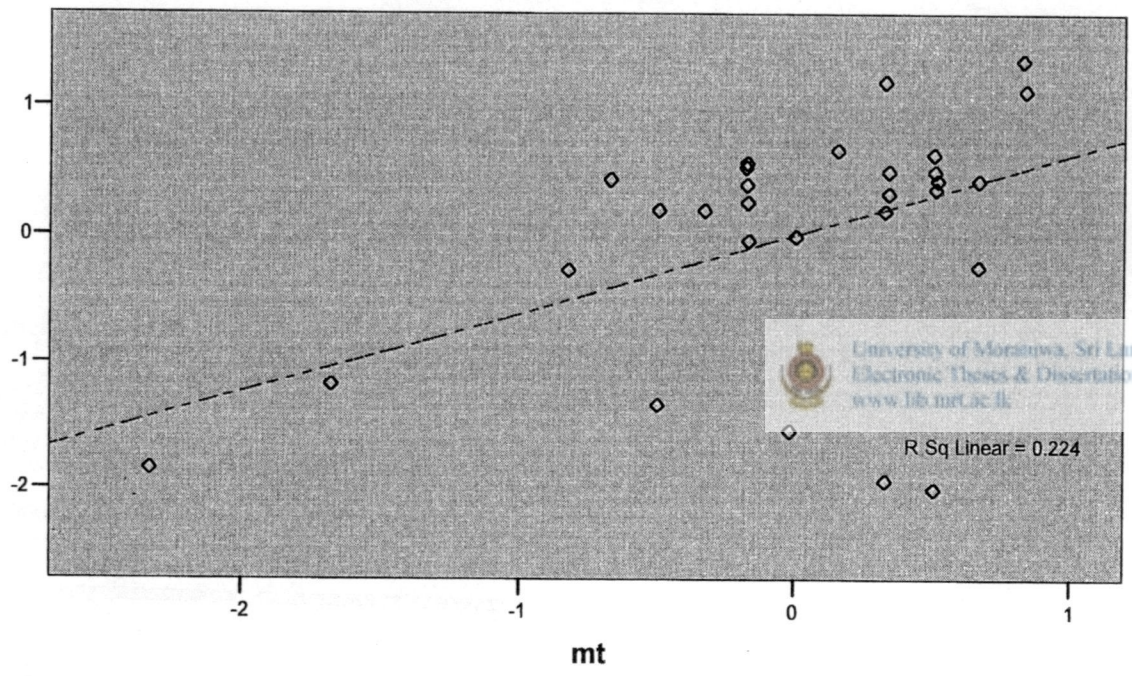
Mean = 1.82E-15
Std. Dev. = 0.965
N = 30

Normal P-P Plot of Regression Standardized Residual



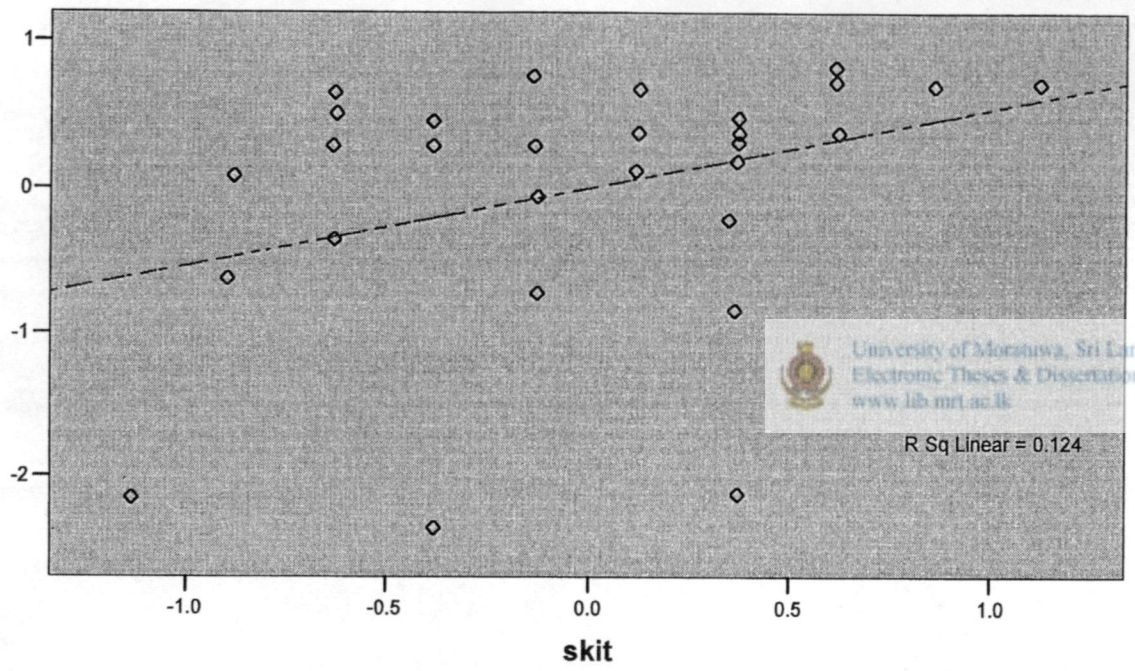
Partial Regression Plot

Dependent Variable: sk



Partial Regression Plot

Dependent Variable: sk



INTRPRETAION OF SPSS OUTPUT ON MULTIPLE REGRESSION

Two MR (Multiple Regression) was run on two dependent variables, Manufacturing Performance, MP and Shared Knowledge, SK.

To test the Hypothesis the significance of Paths 1, 2, 3, 4 and 5, in the conceptual model, has been tested. The regression was run on a hierarchal order, first the relationship between MP and all the variables affecting it, SK, MT and IT per was tested. The equation is

MP = B Constant + B SK + B MT+ B IT Per---------- 1

Second, the relationship between SK and variables MT and IT sk was tested. The equation is

SK = B Constant + B MT + B IT sk----------2

Results:

Equation 1 MP = 1.256 + 0.313 SK + 0.230 MT + 0.229 IT per

Equation 2 SK = -0.667 + 0.619 MT + 0.540 IT sk

Interpretations

In eq. 1, SK, MT and IT per is found to affect MP significantly as the B Coefficient is significant ie, 0.313, 0.230 and 0.229 for the dependent variables SK, MT and IT per respectively.

In eq 2,MT and IT sk is found to affect the SK as the B Coefficient is significant ie., 0.619 and 0.540 for MT and IT sk.

The degree to which the Independent Variables SK, MT and IT per are related to the Dependent Variable MP is expressed in R Coefficient, 1.256 of eq. 1. In multiple regressions R Coefficients is assumed between 0 and 1.

In the same way in the in Eq. 2, Independent Variables MT and IT sk are related to SK is -0.667 (R Coefficient).

To interpret the direction of relationship between Independent variables, we have to look at the sign of the B Coefficient. If the sign is positive then the relationship is positive. So the B Coefficients of SK, MT, IT per and IT sk is positive which confirms the paths mentioned in the model. This tests all the Hypothesis presented.

The regression coefficient B is the average amount the dependent increases when the independent increases by a unit when the independents are held constant.

R-square and Residual Variance

R sq. in EQ. 1 is 0.687 and in EQ 2 is 0.298.

The smaller the variability of the residual value around the regression line relative to the overall variability, better the prediction.

For eg., If there is no relation between MP and SK, IT per and MT, then the ratio of the residual variability of the MP variable to the original variance is equal to 1.0.

If MP and SK, IT per and MT is perfectly related then there is no residual variance and the ratio of the variance is 0.

In our case, in Eq. 1 R Square is 0.687, ie,. We have explained 68.7 % of the original variability and left with 31.3 % residual variability.
In the same way in the Eq. 2 the value is 0.298, which explains 29.8 % variability and left with 70.2% residual variability.
R Square is the indicator of how the model fits the data.

B-Coefficient and the Constant

The B Coefficients, 0.313 for SK, 0.230 for MT and 0.229 for IT per are used to create the regression equation.

MP =1.256+ 0.313 SK + 0.230 MT + 0.229 IT per

The Beta Coefficients 0.395 IT per, 0.500 SK and 0.267 MT mention the relative importance in predicting MP. These are compared within the model and also checks for misspecifications of the model. Any addition or removal of variables in the equation will affect the size of the Beta Coefficients.

The't' tests the significance of each B Coefficients. It's possible to have overall regression model is significant, though the particular coefficient is not.

In our case MT's t value is 2.158 with sig value of 0.04 is not significant to the B 0.230, though the overall model F- 18.995 with sig 0.000, fits well.

Confidence Interval on the B Coefficient is the B Coefficients, which can be substituted in the regression equation to get the higher and the lower estimates.

Collinearity Statistics.

In our case the independent variables are not highly Interco related .
The tolerance for a variable is (1- R Square) for the regression of that variable on all other independent variable, ignoring the dependent.

In our case tolerance is 0.927, 0.742 and 0.786 respectively for the variables IT per, SK and MT respectively.

Variance Inflation Factor, VIF is the reciprocal of (1- R Square). When the VIF is high there is a high multi-collinearity. In our case it's 1.079, 1.347 and 1.272 which is not high.

When VIF = 1.0, there is no linear relation among variables.

When VIF is GT 1, indicates the inflated variance of B Coefficients. If VIF is GT 5-10 regression coefficients have been poorly estimated. Larger VIF among variables is an indicator of severe multi colinearity. In our case, it is between 1.347 to 1.079.

Residual Statistics

Difference between predicted and the actual values.

Standard Residual is the raw residual divided by the SD of residuals. In our case the standard residual is -3.353. At least one prediction is more than 3 SD below the mean residual.

Check for Normal Distribution of Residual Error

The Histogram provides the visual way of assessing if the assumption of Normally Distributed Residual Error is met. In our case the small skew ness towards right should not affect substantive conclusion.

Normal Probability Plot

The normal p-p plot is another test of normally distributed error. Under perfect normality, the plot will be a 45- degree line. In our example it's close.

APPENDIX 3

CENSUS OF INDUSTRIES 2003-2004

Census of Industries - 2003/2004

Listing of Industrial Establishment

Summary Table 2 - Establishment and persons engaged by Industry, Sri Lanka - 2003

Type of Industry	Small Industries (Persons engaged less than 10)		Medium & Large Industries (Persons engaged 10 and more)	
	No.of Establishments	Persons engaged	No.of Establishments	Persons engaged
Other mining and quarrying	5,414	21,388	834	15,560
Manufacture of food products and beverages	35,418	70,955	2,290	102,924
Manufacture of tobacco products	437	1,491	103	5,812
Manufacture of textiles and yarn	2,930	12,199	1,006	52,848
Manufacture of apparel	12,976	27,999	1,633	353,742
Manufacture of leather products	1,181	3,689	190	13,352
Manu.of wood and products of wood and cork	5,944	17,741	428	10,103
Manufacture of pulp and paper based products	229	837	120	7,584
Publishing, printing and reproduction of recorded media	1,738	5,157	280	13,654
Manufacture of refined petroleum products	13	62	8	2,018
Manufacture of basic chemical and chemical products	1,401	4,415	329	18,878
Manufacture of rubber and plastic products	4,534	7,269	501	43,586
Manufacture of non-metalic mineral products	17,486	45,117	754	25,525
Manufacture of basic metal	412	1,256	114	9,059
Manufacture of fabricated metal products	11,434	23,063	248	8,900
Manufacture of machinery and equipment n.e.c. / Manufacture of office accounting and computing machinery	302	775	102	7,258
Manufacture of electrical machinery and equipment n.e.c.	125	383	67	9,722
Manu.of radio,television & communication equipments	81	213	23	2,131
Manu.of medical & optical instruments,watches & clocks	28	82	6	186
Manufacture of motor vehicles,trailers & semi-trailers	209	562	51	1,979
Manufacture of other transport equipment	43	144	30	2,470
Manufacture of furniture & other products n.e.c.	18,286	38,907	688	35,123
Recycling	21	92	8	234
Supply of electricity, gas, steam and hot water	130	228	22	661
Collection, purification and distribution of water	527	1,225	109	4,041
Not Specified	127	374	17	478
Total	**121,426**	**285,623**	**9,961**	**747,828**

Source : Department of Census & Statistics.